Urea, a degradation product, to become food of an insect does require an explanation. Incidentally Schmidt-Nielsen of Duke University, U.S.A., found that "whereas most animals with lower urine output cannot urinate enough to expel waste urea the camel can recycle much of his urea through the liver to make new protein thereby keeping achead on both food and water." However it is generally the practice that if urea is added to cattle fodder it results in improving nutrition. The intestinal bacterial flora of cattle can synthesize urea into proteins and probably the same is the case with the camel. Coming to the oriental species of the genus *Camponotus* they all contain intercellular symbiotic bacteria in the intestine so that it is most likely that these can effectively synthesize urea into protein. This would at once explain how *Camponotus* species alone attend upon the colonies of the two membracids mentioned while other ants do not. Work on the isolation of the symbiotic bacteria and their role in the metabolism of the ant will be reported on later.

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31. ON THE LARVA OF *TRAMEA VIRGINIA* (RAMBUR, 1842) FROM INDIA, WITH NOTES ON THE LARVAE OF INDIAN REPRESENTATIVES OF GENUS *TRAMEA* HAGEN, 1861 (LIBELLULIDAE: ODONATA)

(*With ten text-figures*)

Larva of *Tramea virginia* Rambur is described and illustrated on the basis of material from Dehra Dun Valley, India. Notes on the larvae of Indian representatives of the genus is appended (including *basilaris burmeisteri* Kirby and *similata* Rambur).

Introduction

Genus *Tramea* Hagen, 1861, is widely spread in circumtropical region. It comprises a number of closely allied species with migratory tendencies and having almost identical type of larval habitats like lakes, perennial monsoon ponds and marshes.

Fraser (1936) recorded two representatives of the genus *Tramea* within Indian limits, namely, *T. basilaris burmeisteri* Kirby and *T. limbata* (Desjardins); *T. virginia* was recorded by him (loc. cit.) from Burma, throughout Indo-China, China and Formosa. However, recently *T. virginia* has been recorded from various Indian localities namely, Kangra, Himachal Pradesh (Prasad 1976) and Dehra Dun Valley, Uttar Pradesh (Singh & Prasad 1976). Lieftinck (1962) has discarded the specific status of *T. limbata* from E. Asia

and Pacific and has designated Indian representative of *T. limbata* as *T. similata* Rambur (per. com.).

Fraser (1919) has briefly described larva of *T. similata* (sub. *limbata*) from Pune (Poona), India; Kumar (1973) has given detailed description and illustration of larva of *T. basilaris burmeisteri* Kirby from the Dehra Dun Valley, India. In the present paper the larva of *T. virginia* is being described for the first time from an Indian locality, Needham (1930) had earlier given a brief description of it from Soochow in China. An attempt has also been made to provide taxonomic characters for the differentiation of these closely resembling larvae of Indian representative of the genus.

Tramea virginia (Rambur) Figs. 1-10

Material: Larvae 1♂, 1♀ (both emerged in the laboratory), perennial pond, Gorakhpur Dehra Dun, India, 26-iii-1976. A. Kumar Coll.; 4 preserved in spirit, same data as above.

Description: Length 26.8 mm (26.0-28.2 mm); width 9.1 mm maximum across 6th abdominal segment. *Colour*: Yellowish green with grey markings.

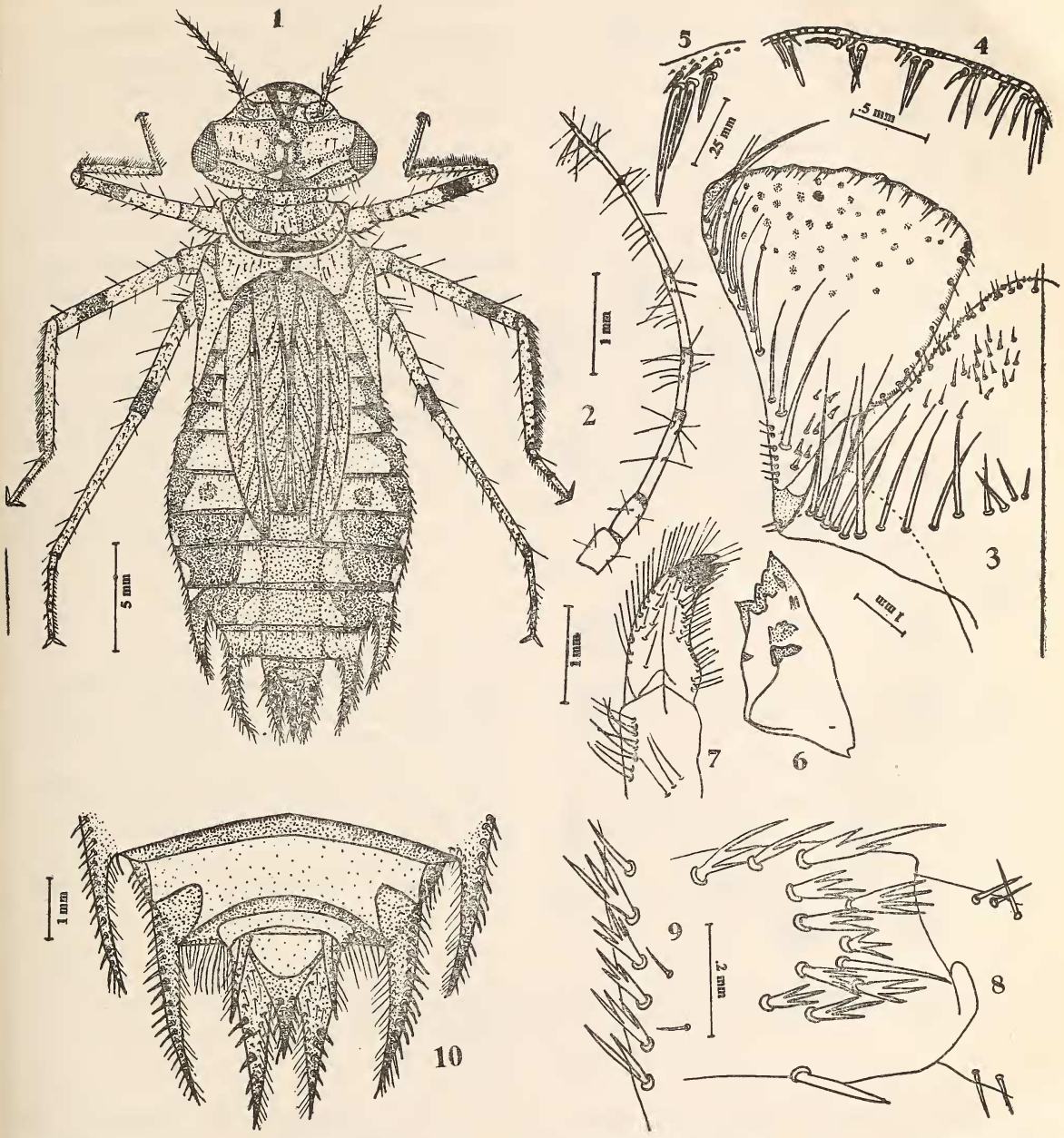
Head: Widest over the vertex across the eyes. Length 5.4 mm, width 7.8 mm. *Eyes*: grey; vertex-sienna; *Antenna* (Fig. 2) long, filiform. The measurement (in mm) of segments being 0.43, 0.47, 0.93, 0.63, 0.83, 1.30, and 0.90; total length 5.49 mm. *Labium* (Figs. 3 & 4) premental setae 14 + 14, 4 median premental setae of either side shorter than half of size of marginal setae, spiniform setae present in mid-anterior region of prementum. Distal margin of prementum strongly convex, bears a row of claviform setae. Palpal setae 11 & 11; distal margin of palpus formed into 12 crenations, each of which, except a few posterior ones, bear 3 very short and 2-3 long claviform setae (Figs. 4 & 5). A number of spiniform setae present at the base and lateral margins of palpus. Movable hook long and slender. *Mandible* and *Maxilla* as shown in figure (Figs. 6 & 7).

Tibial comb: (Fig. 8) comprises a number of compactly arranged furcate setae; tarsi (Fig. 9) beset with furcate and a few simple setae on their outer side. *Abdomen* oval, yellowish with grey spots; spines on segments 8 & 9. Lateral spine of segment 9 extends almost up to the distal end of anal appendages (Fig. 10) these spines thickly beset with simple spinules on their outer side and long thin setae on the inner side.

Anal appendages: (Fig. 10) a little darker than abdomen; epiproct distinctly shorter than paraprocts. *Epiproct* length 2.2 mm, width 1.4 mm (at base); *Paraprocts* length 3.1 mm. Epiproct and paraprocts beset with spinate setae. *Biology*: Larvae have been collected from the perennial muddy ponds at the villages Gorakhpur and Badripur, Dehra Dun, India. Larvae are active swimmers and dwell amidst the weeds. Emergence occurs for a short period in early spring, i.e., end March to beginning of April.

Solitary adults, flying low over the water area, were observed on these ponds throughout April. Coitus was observed on 27-iv-76, when a pair was copulating, perching on a bush about 3 metres above the ground near the pond. Earlier the same pair was seen flying in tandem about 15 m above that bush. Oviposition occurs in tandem, a few pairs were seen flying in this position over the pond.

Diognosis: Larvae of closely allied Indian species of genus *Tramea* appear quite alike. With the present description of *T. virginia*, now the larvae of this and *T. basilaris burmeisteri* are fairly well known. However, Fraser's (1919) description of *T. similata* (sub. *lim-*



Figs. 1-10. Last Instar larva *Tramea virginia* (Rambur): 1. Larva (D.V.) Male; 2. Antenna; 3. Labium (left half); 4. Enlarged view distal margin palpus; 5. Enlarged view one crenation palpus; 6. Mandible; 7. Maxilla; 8. Tibial comb; 9. Setae tarsi; 10. Anal appendages (male).

bata) is not adequate. Since he has not taken into consideration taxonomically important characters like number of premental and palpal setae, etc. However, with our present knowledge the larvae of *T. virginia* could be differentiated from that of *T. basilaris burmeisteri* on the basis of body size (larva of the latter being smaller 22.0-22.4 mm); number of premental and palpal setae (their number in case of *T. basilaris burmeisteri* being 13-13; 10 & 10) and larval habitat; *T. basilaris burmeisteri* typically breeds in Ephemeral monsoon ponds, ovipositing in June-July while its emergence occurs from these ponds in September-October.

Though the description of the larva of *T. similata* is not adequately known, with the known characters, larva of *T. virginia* can be differentiated from it on the basis of number of crenations at the distal margin of palpus; these are 18 in case of *T. similata* while only 12 in *T. virginia*.

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32. COLOUR ABERRANCE IN *COCCINELLA SEPTEMPUNCTATA* L. (COLEOPTERA: COCCINELLIDAE)

(*With ten text-figures*)

The individuals of the above species depict a variety of colour patterns. The fact has been established by making constant observations on colour aberrance in a huge population of *Coccinella septempunctata* L. throughout the semi-desert areas of Punjab namely, Bhatinda, Abohar and Fazilka during insect collection surveys in 1974-75 on the lines as reported